The New York Bight Floatables Action Plan Assessment Report 2013

Photo: EPA Employee, Kathryn Drisco departing from the EPA Edison facility to conduct floatable surveillance and water quality sampling from the helicopter.

United States Environmental Protection Agency, Region 2
Division of Environmental Science and Assessment
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http://www.epa.gov/region2/monitor/nybight/index.htm

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The New York Bight
Floatables Action Plan
Assessment Report
2013

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Abstract

The Floatables Action Plan addresses floatable debris in the New York Bight, which includes the New York/New Jersey Harbor Complex and the shorelines of Long Island and New Jersey. The plan was developed jointly, in 1989 by an interagency workgroup that included representatives from the U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Coast Guard, National Oceanic and Atmospheric Administration, New Jersey Department of Environmental Protection, New York State Department of Environmental Conservation, New York City Department of Environmental Protection, the New York City Department of Sanitation, and the Interstate Environmental Commission. The Floatables Action Plan has been carried out each year since to control wash ups of floatable debris on area beaches. The plan consists of aerial surveillance via helicopter and fixed winged plane; a communications network to report "slick" sightings and to coordinate cleanup response; and routine cleanups conducted by skimmer vessels in the harbor area. Since its inception, the plan has significantly reduced the amount of floating debris escaping the Harbor Complex and has expanded to include volunteer collection programs, boom and skim programs, combined sewer overflow collection programs and beach cleanup programs. To date, approximately 458 million pounds of debris have been removed from the New York Bight area.

This report summarizes the 2013 efforts of the interagency partners in implementing the Floatables Action Plan and accomplishing the following objectives:

- Elimination of the amount of floatable debris escaping the New York/New Jersey Harbor Complex.
- Maintaining an effective communication network to coordinate floatable debris removal activities and to respond to the spotting of slicks.
- Elimination of the adverse impact of floatable debris on the marine environment.
- Ensuring timely notification of beach operators concerning potential wash-ups of floatable debris.
- Elimination of beach closures due to floatable debris.

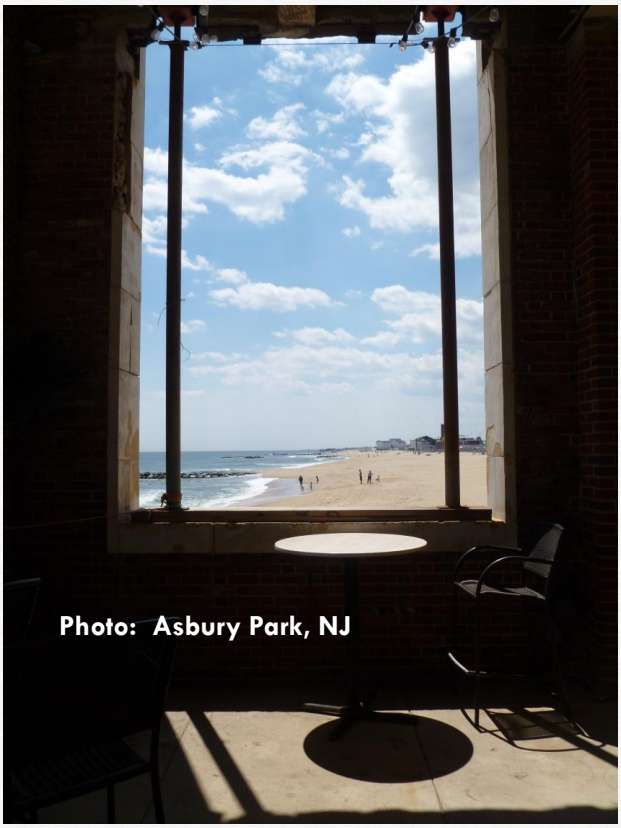

Photo: Asbury Park, NJ

New Jersey beaches and southern Long Island beaches experienced no beach closings due to floatable debris in 2013. The interagency implementation of the Floatables Action Plan was a major contributor to maintaining this improved beach status.

EPA aerial surveillance via helicopter has been an ongoing component of the Floatables Action Plan, however, as of June 2014, the EPA Helicopter Program was not funded for the 2014 season.

Introduction

Floatable debris consists of a wide assortment of plastic, wood, paper, glass, rubber, metal and organic waste materials that float or are suspended in the water column and may eventually be deposited on shorelines and beaches. Floatable debris originating from street litter, combined sewer overflow (CSO) discharges, storm water discharges, decaying shoreline structures, pleasure boaters, and littering beach goers, can harm the marine environment and cause area beaches to close.

During the summers of 1987 and 1988 the impacts of the floatable debris in the New York and New Jersey water bodies were alarming. Several beaches were forced to close down for extended periods of time due to debris washing up on the shores. The State University of New York Waste Management Institute estimated an economic loss of between $900 million and $4 billion in New Jersey and between $950 million and $2 billion in New York. In response, the Floatables Action Plan was developed to establish clean-up measures for the New York/New Jersey (NY/NJ) Harbor Complex and consequently, the surrounding beaches.

The Floatables Action Plan was developed jointly by an interagency work group comprised of the Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (USACE), U.S. Coast Guard (USCG), National Oceanic and Atmospheric Administration (NOAA), New Jersey Department of Environmental Protection (NJDEP), New York State Department of Environmental Conservation (NYSDEC), New York City Department of Environmental Protection (NYCDEP), New York City Department of Sanitation (NYCDOS), and the Interstate Environmental Commission (IEC).

The Floatables Action Plan is part of EPA's response to its mandated responsibilities as defined under the Marine Plastic Pollution Research and Control Act of 1987. Subtitle C of the act mandates that the EPA, in consultation with NOAA and other Federal agencies, prepare a New York Bight Restoration Plan. As part of the Restoration Plan, the Floatables Action Plan was designed to focus on locating and cleaning up floatable debris in the NY/NJ Harbor Complex and surrounding areas. Specific objectives include: improve water quality, protect the marine environment, and prevent the occurrence of beach closures due to floatable debris. This plan was amended in 2008 to include increased surveillance coverage, increased communication with the Passaic Valley Sewerage Commission, and increased cross communication among agencies. The most recent 2013 update of the plan can be found at: http://www.epa.gov/region2/water/.

Through interagency cooperation, partnership building, and effective communication, the objectives stated in the Floatables Action Plan have been achieved. This report is an historical account of various activities to control floatable debris since the initiation of the Floatables Action Pan. This report is not all inclusive and only accounts for major activities surrounding floatable removal. Table 1 summarizes the amount of debris collected in 2013, the total amounts collected since the initiation of the program, and the annual average of floatables collected for each program.

Table 1. Summary Table of Floatables Collection Programs

Floatables Collection Program	Floatables Collected in 2013	Total Floatables Collected	Annual Average of Floatables Collected (per number of years collected)
USACE Drift Collection Vessels Program	13,486,260 lbs	271,842,260 lbs 1988-2013, 26 years	10.46 million lbs
Ocean Conservancy's International Coastal Clean-up (8 counties in NY)	51,824 lbs	2,525,763 lbs 1994-2013, 20 years	.13 million lbs
NYCDEP Cormorant Open Water Skimmer Vessel Collection Program	No longer operational	6,891,940 lbs 1994 – 2008, 15 years	.43 million lbs
NYCDEP Boom and Skim Collection Program	500,580 lbs	14,336,352 lbs 1995-2013, 19 years	.75 million lbs
New Rochelle, NY Boom Collection Program	Not operational due to damage caused by Super Storm Sandy	116,674 lbs 1998-2012, 15 years	.01 million lbs
NJDEP Clean Shores Program	3,302,200 lbs	140,690,200 lbs 1989-2013, 25 years	5.63 million lbs
PVSC Skimmer Vessel Collection Program	793,940 lbs	5,246,560 lbs 2000-2013, 14 years	.37 million lbs
PVSC Passaic River/Newark Bay Shoreline Restoration Program	500,320 lbs	16,972,980 lbs 1998-2013, 16 years	1.1 million lbs
TOTAL*	**18,635,124 lbs***	**458,622,729 lbs***	

* All values are approximate. For comparison reasons, some values are based on a conversion factor of 100 cubic feet per 2000 pounds. Historical values as reported by the various agencies are listed in Appendixes 1 – 3.

Interagency Collection Programs

The United States Army Corps of Engineers (USACE) Drift Collection Vessels Program

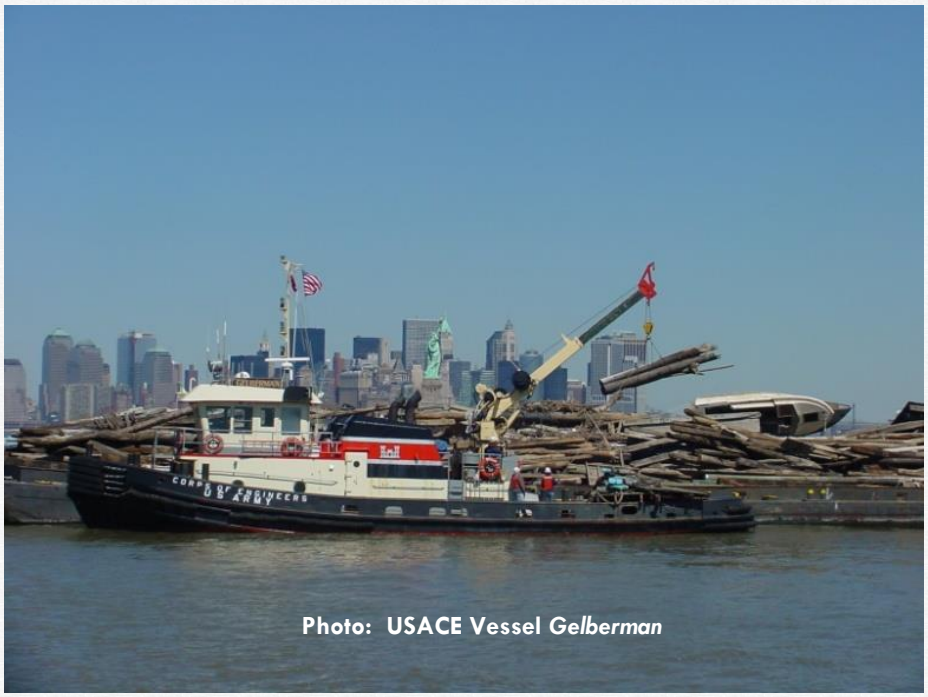

Photo: USACE Vessel *Gelberman*

The USACE is one of the main partners involved in the Floatables Action Plan. With the use of drift collection vessels (the *Hayward*, *Driftmaster* and *Gelberman*), they are able to collect much of the floatable debris found throughout the NY/NJ Harbor Complex. The Water Resources Development Act (WRDA) of 1974 was modified by WRDA 90 Section 102 (V) Public Law 99-662, to authorize the USACE to collect floatable debris while removing navigational hazardous. The USACE estimates that 90 percent by volume of its collection total consists of wood debris. Tires, plastic waste, cardboard, seaweed, sewage-related materials and street runoff-related materials constitute the remaining 10 percent by volume. The USACE drift collection vessels collected an estimated 6,743 tons (13,486,000 lbs) of floatable debris throughout 2013. Information about the USACE yearly total drift collection amounts from 1988 to 2013 can be found in Appendix 1. Website: http://www.nan.usace.army.mil

New York City Department of Environmental Protection (NYCDEP) Vessel Program and, Boom and Skim Collection Program

The 1992 CSO Abatement Order on Consent between the NYCDEP and New York State Department of Environmental Conservation (NYSDEC) required the NYCDEP to implement a short-term booming and skimming program to address floatables debris from approximately 50 percent of the City's CSO area. From 1994 – 2008, the NYCDEP operated a large open water skimmer vessel, the *SV Cormorant*, in the NY/NJ Harbor. Starting in 1995, four smaller skimming vessels were used in Jamaica Bay, the East River, Newtown Creek, Buttermilk Channel, Flushing and Bowery Bays. These vessels collected approximately 250.29 tons (500,580 lbs) of debris in 2013. Appendix 2 lists historical collection amounts. Website: http://www.nyc.gov/html/dep/html/harborwater/float.shtml#boom

Ocean Conservancy's International Coastal Clean-up

The Ocean Conservancy sponsored the September 2013 Annual International Coastal Cleanup. In 2013, 4,864 volunteers coordinated by the American Littoral Society, cleaned and documented 51,824 pounds of debris along 127 miles of New York State's shoreline. The data shown in this report covers eight selected counties in New York: Suffolk, Nassau, Queens, Kings, Richmond, Manhattan, Bronx, and Westchester.
Website: http://www.nysbeachcleanup.org/

New Rochelle, NY Boom Floatable Debris Collection System

In 1998, the City of New Rochelle, under a New York State Division of Environmental Conservation (NYSDEC) grant, installed a "Stream Floatables Debris Collection System" at the Stephenson Brook storm water drainage area outfall, which empties into Echo Bay and Long Island Sound. The system had a holding capacity of 1 cubic yard of debris. Due to damage caused by Super Storm Sandy, the collection system was not operational in 2013. Historical collection totals are located in Appendix 2.


Photo: NJDEP's Clean Shores Program

NJDEP's Clean Shores Program

Beginning in 1989, NJDEP began a program now called "Clean Shores", designed to collect shoreline floatable debris before it became resuspended due to tidal influences. This program uses New Jersey inmates to collect floatable debris, comprised mainly of landed drift wood, on non-recreational shorelines in order to prevent floatable debris from being re-floated during extreme high tides and washing up on recreational beaches, and/or becoming hazards to navigation and impacting marine life. Clean Shores is conducted throughout the State of New Jersey in the Hudson, Raritan and Delaware estuaries and barrier island bays. In 1993, the Clean Shores Program was put into service on a year-round basis whereas formerly it was only implemented during the bathing season. This program is funded by the sale of Shore Protection license plates. The Clean Shores Program collected approximately 1,651 tons (3,302,200 lbs) of debris in 2013. Historical collection totals per miles of shoreline cleaned, are located in Appendix 3.
Website: http://www.state.nj.us/dep/wms/bmw/cleanshores/csindex.html

Passaic Valley Sewerage Commissioners (PVSC) Skimmer Vessel Collection

The Passaic Valley Sewerage Commissioners (PVSC) operates two skimmer vessels on the Passaic River and in Newark Bay. The larger vessel, SV Newark Bay, is used in the Passaic River and Newark Bay. The smaller vessel, SV Passaic Valley, is used in the upper parts of the Passaic River where the larger vessel cannot reach, due to shallow waters and low bridges. Approximately 396.97 tons (793,940 lbs) of debris were collected in 2013. Historical collection totals are located in Appendix 3. Website: http://www.nj.gov/pvsc

PVSC Passaic River/Newark Bay Shoreline Restoration Program

In 1998, PVSC established a program to remove trash along the banks of the Passaic River. The program provides coordination and support to municipalities, counties, citizens, service groups, and local businesses to conduct shoreline clean-ups along the river and in their communities. In addition to the sponsorship of voluntary efforts, PVSC has implemented an extensive clean-up of the river's shoreline by creating a River Restoration Department dedicated to the removal of trash and debris from the Passaic River and Newark Bay. In 2013, approximately 250.16 tons (500,320 lbs) of debris were collected. Historical collection totals are located in Appendix 3.
Website: http://www.nj.gov/pvsc

Additional Programs

In past Floatable Action Plan Assessment Reports, data were included for the NYCDEP's beach clean up program and for twelve New Jersey Municipalities participating in a debris collection program. These programs are still being conducted, however the information is no longer being supplied for inclusion in this report. This report is not intended to be all inclusive, many other efforts by non governmental agencies and volunteer groups continue to help mitigate floatables in the marine environment.

Aerial Surveillance

Floatable surveillance of the NY/NJ Harbor Complex was conducted Monday through Saturday, excluding routine maintenance or inclement weather days, from late May through early September, 2013 via the EPA helicopter. With the use of a plane and/or helicopter, NJDEP conducted aerial surveillance of coastal waters six days a week during the 2013 summer seasons. Flights were conducted from Raritan Bay, around Sandy Hook and south to Barnegat Light on Mondays, Tuesdays, Fridays and Saturdays and from Raritan Bay around Sandy Hook south to Cape May Point on Thursdays and Sundays.

Photo: NJDEP's Surveillance Aircraft

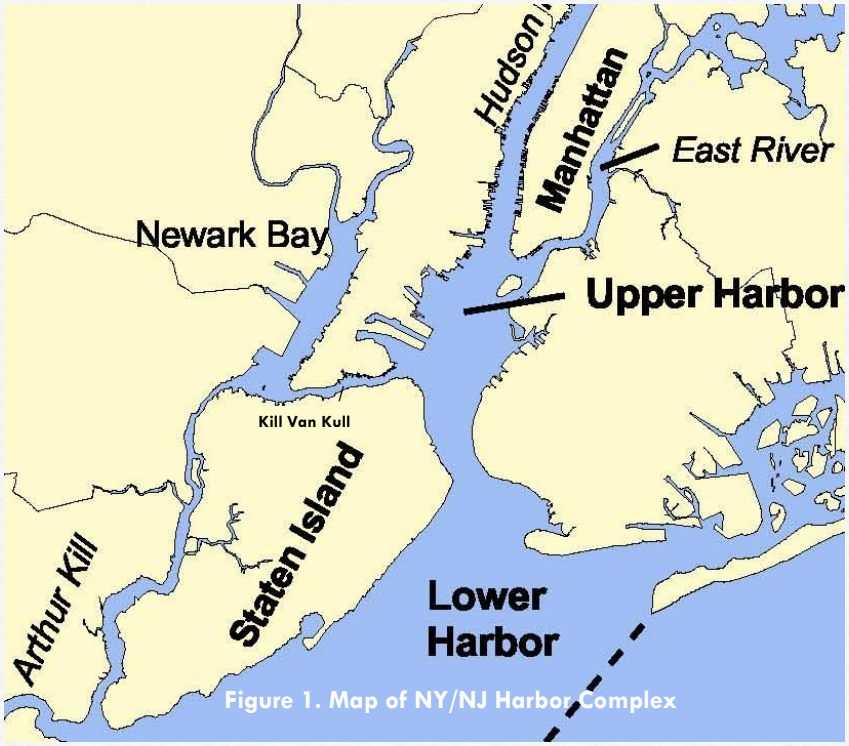

Figure 1. Map of NY/NJ Harbor Complex

EPA Floatable Surveillance Location

For purposes of this report, the NY/NJ Harbor Complex is defined as the following five waterbodies: 1) the Arthur Kill; 2) Newark Bay, as far north as the New Jersey Turnpike Bridge; 3) the Kill Van Kull; 4) the Upper New York Harbor, including the lower portions of the Hudson River and the East River as far north as Central Park, New York; and 5) the Lower New York Harbor including Gravesend Bay, and the shoreline of Coney Island as far east as the Marine Parkway Bridge (Figure 1).

EPA Reportable Floatable Debris

For cleanup purposes, the Floatables Action Plan defined a significant "slick" as an aggregation of floating debris of indefinite width and a minimum length of approximately 400 yards (USEPA, 1989). Using this as a guideline, all slicks have been divided into two categories: 1) slicks 400 yards to one mile in length, and 2) slicks greater than one mile in length.

EPA 2013 Floatable Observations

Forty-eight significant floatable slicks were observed in 2013. The Lower NY Harbor and Newark Bay had the most slicks observed, fourteen each, and the Kill Van Kull, with four slicks observed, had the least. Eight slicks were observed in the Upper NY Harbor and seven slicks were observed in the Arthur Kill.

Helicopter Sampling Support

In addition to the floatable surveillance, the EPA helicopter was used to conduct water quality sampling in support of the New York and New Jersey National Sanitation Shellfish Programs.

Photo: EPA's Surveillance Helicopter

Trends – Floatable Sightings in the New York/New Jersey Harbor Complex

A total of 761 significant slicks was observed over a 25 year period with the majority of slicks observed, 82.9 percent in the 400 yard to one mile in length category, and 17.1 percent in the greater than one mile category (Figure 2). The sightings of slicks were variable from year to year with the most number of slicks, 81 reported in 1990. The least number of slick sightings, six slicks, was reported in 1998. For the 25 year period, an average of 30 floatable slicks was observed. In 2013, the 48 slicks observed, were above average, possibly due to effects from Super Storm Sandy (Figure 2).

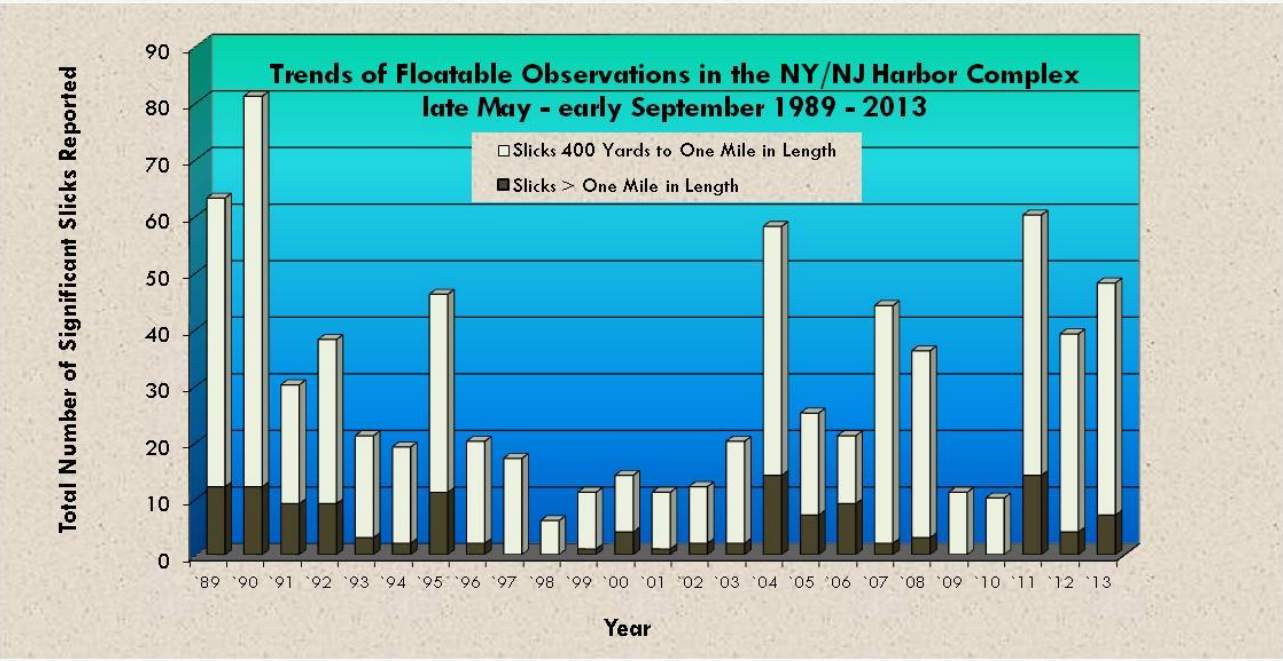

Figure 2. Trends of Floatable Observations by Size Category

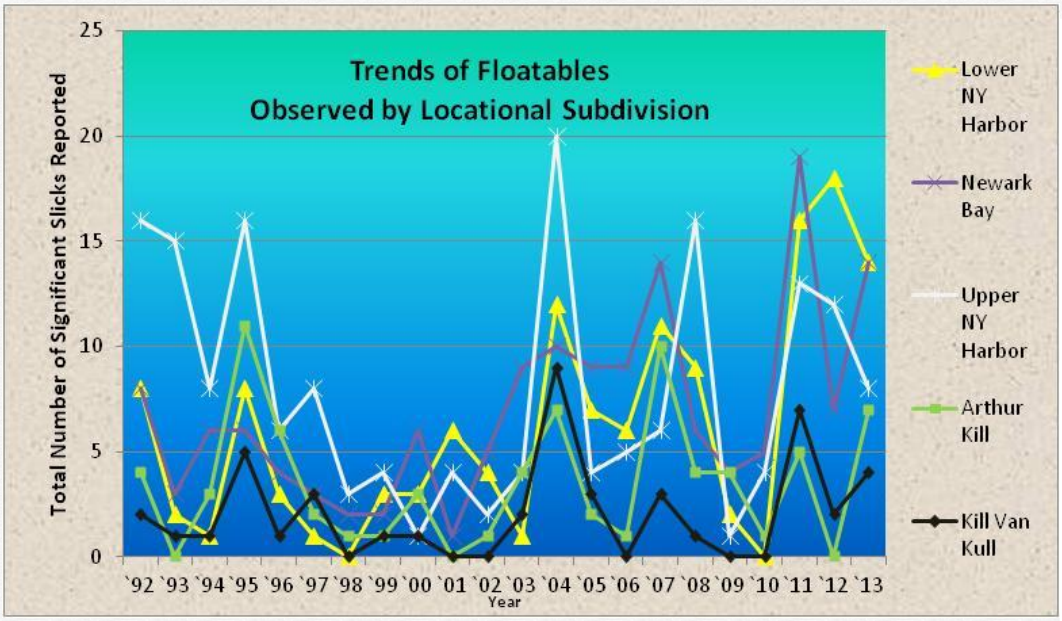

Figure 3. Trends of Floatable Observations by Locational Subdivision

Locational Subdivision

The Upper New York Harbor had the greatest number of slicks, 176, observed in the 22 year period. The Kill Van Kull, with 46 slicks, had the least number of slicks observed (Figure 3). Newark Bay had 152 slicks observed, the Lower New York Harbor had 135 slicks observed, and the Arthur Kill had 77 slicks observed during the 22 year period.

Beach Closures

Before the Floatables Action Plan was initiated, New Jersey beaches were plagued with floatable washups responsible for closing 25 miles of beach in May 1987 and 50 miles of beaches in August 1987. In 1988, floatable washups were responsible for closing 60 miles of New York beaches. Since the initiation of the plan and its continued success, beach closures due to floatable debris have been minimal. Floatable washup can occur over various periods of time and affect several beaches. From 1989 to 2013, New York experienced eight floatable debris beach closure incidences and New Jersey experienced ten floatable debris beach closure incidences (Figure 4). The following is an historical list of beach closures incidences due to floatable debris:

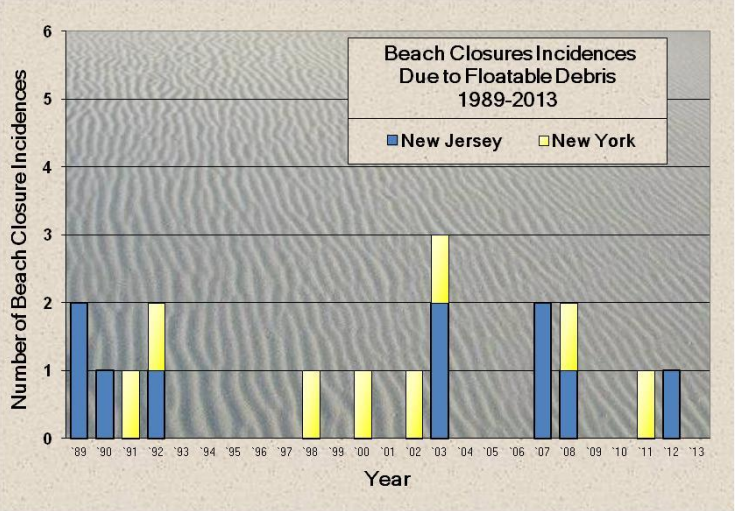

Figure 4. Beach Closure Incidences

- In 1989, several Ocean City, NJ beaches were closed on July 20, 1989 due the washup of medical debris. Several Sandy Hook, NJ beaches were closed on August 18 and19, 1989 due to the washup of medical debris. In total, 9 closures occurred, accounting for two beach closure incidences.
- 1990: Ten Monmouth County, NJ beaches were closed due to floatables on June 26, 1990.
- 1991: Jacob Riis Park Beach, Brooklyn, NY was closed on August 31, 1991 due to the washup of medical waste.
- 1992: On July 22, 1992, a beach in Spring Lake, NJ was closed for a period of several hours due to a floatable debris washup. NJDEP does not regard this incident as an official designated bathing area closure due to its brevity. The Lawrence Beach Club in Atlantic Beach, NY was closed on July 20, 1992 due to the washup of medical waste.
- 1998: NY beaches: Rockaway, Midland, Wolfe's Pond, South and Coney Island Beaches were intermittently closed between July 26 and 29. During this period, medical debris was found on various stretches of beaches.
- 2000: Beaches in Nassau County, NY were closed on August 7, 2000. A total of nine separate beaches (two in the Town of Hempstead and seven in the Village of Atlantic Beach) was closed due to the discovery of 40-60 syringes.
- 2002: Beaches in Suffolk County, NY were closed from June 12-13 due to the washup of a raw liquid latex material (which solidified when it came into contact with water) found along a six mile stretch from Moriches Inlet to Smith County Park.
- 2003: A total of 11 beaches (in Dover Township and in Lavallette, NJ) in a 1.5 mile section of beach was closed due to medical waste. This precautionary closing occurred at 4:30PM on July 11 and the beaches were opened by the next morning. The City of Long Beach (in Nassau County, NY) closed 4 areas of their beach (approximately 1000 feet of beach) due to medical syringes actively washing ashore. Beaches reopened by July 25, 2003. On July 26, 2003, the Village of Atlantic Beach, NY closed its East Atlantic Beach due to the active washup of a small number of medical syringes. This beach was reopened by July 27, 2003. The closings in Long Beach and in Atlantic Beach are considered one incident. Two beach closings in Ocean County (Deauville in Brick Twp. and the Normandy Beach Association in Dover, NJ) were closed in the afternoon because of a floatable debris washup. Some syringes were found, but most of the debris was street litter. Beaches were reopened the following morning.
- 2007: On the afternoon of September 2, the NJDEP hotline received numerous reports of trash and debris washing on to beaches in Brick and Normandy Beach. Two beaches in Normandy Beach and two Chadwick Beaches were closed by 3:00 pm and reopened at 10 the following morning. August 24, a Raritan Bay beach, Thompson Ave Beach, in Middeltown was closed at 3:30 pm and reopened the following morning.
- 2008: On July 5, approximately 100 unexploded fireworks shells washed up on Jones Beach forcing the closure of the state park. After a thorough inspection, the park was reopened the next day. On August 23, approximately 150-200 vacutainer tubes, several syringes and medical cotton swabs washed onto beaches in Avalon. All beaches between 9th and 24th Streets were closed. Additional medical waste continued to wash in at various beaches from August 23 through September 4. Beaches closed and reopened as waste washed in and was removed. The great majority of the waste was caused by an intentional criminal dumping event. During this event other syringes were found on beaches in Ocean City and Sea Isle City, beaches in those towns also closed. A total of 120 closing occurred over 6 days, accounting for one beach closure incident. In 2010, the guilty party received four years probation and was fined $100,000 paid to the borough of Avalon to compensate for the cleanup costs.
- 2011: On August 22, eight beaches within Long Island's Atlantic Beach were closed after medical waste washed ashore. Dozens of pill bottles, syringes and other medical waste was cleaned up and the beaches were reopened the following day.
- 2012: On June 16, 12 miles of beach from Barnegat Light to Beach Haven, NJ were closed late in the afternoon after medical waste washed ashore. Approximately 50 syringes, plastic debris, tampon applicators, grass and other vegetation were cleaned up and the beaches were reopened the following day.

Floatable Collection Trends

Figures 5 and 6 show a compilation of floatable debris collected by the interagency partners as listed in Table 1. NJDEP's Clean Shores program collects an average of over 2,000 tons of debris each year, and the USACE collects an average of over 5,000 tons of debris each year (Figure 5). A significant increase in the amount of floatables collected occurred from 1988 to 1989, due to the addition of the NJDEP Clean Shores program. However, in 1994 the Clean Shores program was cut in half due to funding and a slight decrease in floatable debris collection can been seen.

In general, the amount of floatable debris collected remained steady for ten years from 1997 to 2006 with a decline reported in 2007 and remained relatively steady through 2012. In 2013, a considerable increase is shown for the USACE Collection Program possibly due to effects of Super Storm Sandy.

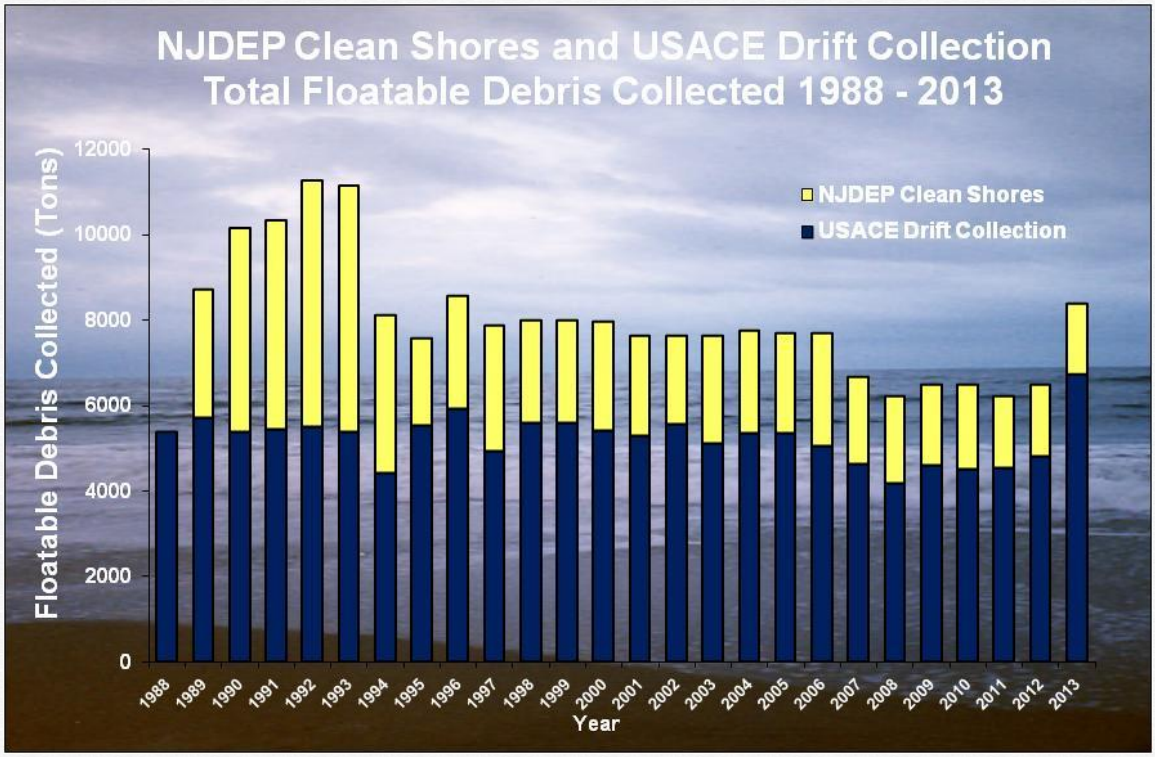

Figure 5. Major Players in Floatable Collection; NJDEP Clean Shores and USACE Drift Collection, Total Floatable Debris Collected, 1988 – 2012.

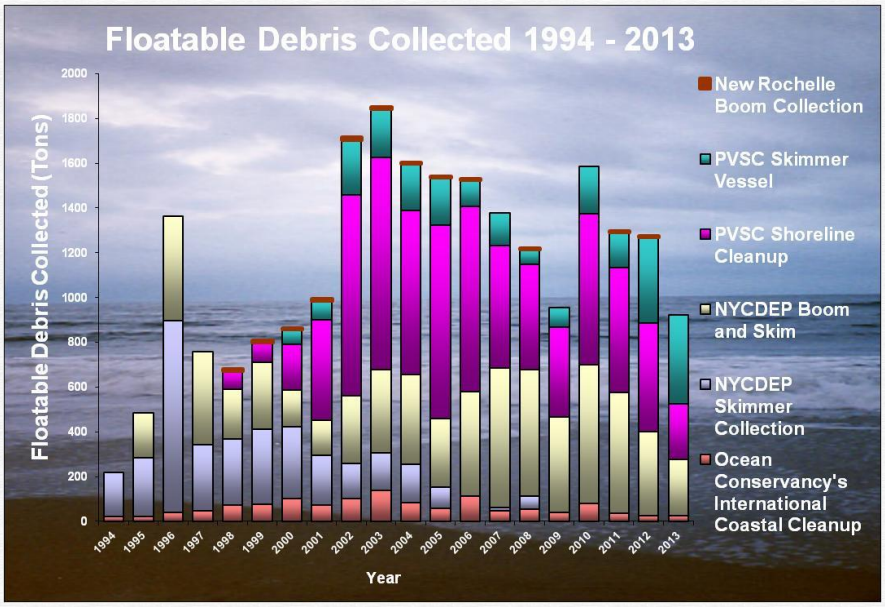

Figure 6. Floatable Debris Collected From Six Participating Programs

Among the other programs reporting, Figure 6, a steady increase of debris collected is shown from 1998 with the highest amount collected in 2003. 2003 through 2009 shows a relative decreasing trend with a significant increase in the amount of debris collected for 2010 followed by a steady decrease from 2011 through 2013.

Appendices

Appendix 1 – United States Army Corps of Engineers (USACE) Drift Collection Vessels Program Collection Totals

Appendix 2 – New York City Department of Environmental Protection (NYCDEP) Vessel/ Boom and Skim Program, Ocean Conservancy's International Coastal Cleanup Results for 8 New York Counties, New Rochelle, NY Boom Collection Data

Appendix 3 – New Jersey Department of Environmental Protection's (NJDEP) Clean Shores Program, Passaic Valley Sewerage Commissioners (PVSC) Skimmer Vessels Collection Data, PVSC's Passaic River/Newark Bay Restoration Program: Shoreline Cleanup Element

Appendix 1

USACE Drift Collection Vessels Program Collection Totals

Year	Total Drift Collection (Cubic Feet)	Estimated Total Drift Collection (Tons)
1988	537,353	5,374
1989	571,645	5,716
1990	537,770	5,378
1991	544,350	5,444
1992	548,970	5,490
1993	539,355	5,394
1994	442,615	4,426
1995	552,840	5,528
1996	592,450	5,925
1997	493,400	4,934
1998	558,900	5,589
1999	560,575	5,606
2000	539,930	5,399
2001	528,875	5,289
2002	557,050	5,571
2003	512,350	5,124
2004	536,200	5,362
2005	534,210	5,342
2006	504,200	5,042
2007	461,755	4,617
2008	416,550	4,165
2009	459,875	4,599
2010	451,850	4,519
2011	454,265	4,543
2012	480,175	4,802
2013	674,313	6,743
TOTAL	13,591,821	135,921

Appendix 2

NYCDEP Vessel/ Boom and Skim Program, Ocean Conservancy's International Coastal Cleanup Results for 8 New York Counties, New Rochelle, NY Boom Collection Data

Year	NYCDEP SV Cormorant (Tons)	NYCDEP Boom and Skim Program			Ocean Conservancy's International Coastal Cleanup Results for 8 New York Counties (Pounds/Miles)	New Rochelle Boom Collection Totals (Cubic Feet)
		Zone I Jamaica Bay (Cubic Yards)	Zone II/III East River Newtown Creek Buttermilk Channel (Cubic Yards)	Zone IV Upper East River Flushing/ Bowery Bays (Cubic Yards)		
1994	197.87	Prior to Program Initiation			42,622 lbs/82.10 miles	Prior to Program Initiation
1995	262.2	258.5	123	353	46,001 lbs/98.75 miles	
1996	856.2	732.5	195.5	801.5	83,533 lbs/108.60 miles	
1997	294	657.5	222	657	95,201 lbs/168.97 miles	
1998	296.4	331.5	65	418.5	145,705 lbs/194.00 miles	548
1999	333.4	324.25	116	676.5	153,507 lbs/162.4 miles	953
2000	320	138	124.75	351	202,553 lbs/233.2 miles	483
2001	222.15	133	140.5	309	142,632 lbs/159.0 miles	857
2002	157.49	397.5	130.25	592.5	204,078 lbs/198.83 miles	1080
2003	166.04	426	306.25	648	277,972 lbs/264.75 miles	680
2004	171.27	445	120.25	928.5	165,861 lbs/185.59 miles	379
2005	94.8	249	109.8	772	115,012 lbs/235.95 miles	295
2006	0	293	147.5	1,278	228,467 lbs/216.52 miles	124
2007	16.74	382	332.25	1,594	92,762 lbs/324.99 miles	0
2008	57.41	416.5	265.5	1,404	112,924 lbs/251.16 miles	48.6
2009	0	373	259.25	945	80,457 lbs/182.59 miles	0
2010	0	623	368	1,304.5	158,491 lbs/244.45 miles	0
2011	0	338.5	375.75	1,275.5	75,672 lbs/176.51 miles	224.1
2012	0	211.5	553.5	628	50,489 lbs/180.27 miles	162
2013	0	143.5	87	696.5	51,824 lbs/ 127.1 miles	0
Total	3,445.97	6,873.75	4,042.05	15,633	2,525,763 lbs	5833.7

Appendix 3

New Jersey Department of Environmental Protection's (NJDEP) Clean Shores Program, Passaic Valley Sewerage Commissioners (PVSC) Skimmer Vessels Collection Data, PVSC's Passaic River/Newark Bay Restoration Program: Shoreline Cleanup Element

Year	Clean Shores Program : Tons of Floatable Debris Collected/ NJ Shore Miles	PVSC Skimmer Vessels: SVNewark Bay 50ft, SVPassaic River 32ft Collection data (Tons)	PVSC's Passaic River Newark Bay Restoration Program: Shoreline Cleanup Element (Tons)
1989	3,000 tons /24 miles	Prior to Program Initiation	Prior to Program Initiation
1990	4,800 tons/ 48 miles		
1991	4,900 tons/74 miles		
1992	5,800 tons/85 miles		
1993	5,750 tons/71 miles		
1994	3,700 tons/62 miles		
1995	2,050 tons/80 miles		
1996	2,650 tons/103 miles		
1997	2,953 tons/146 miles		
1998	2,400 tons/138 miles		85.6
1999	2,400 tons/182.4 miles		88.71
2000	2,563 tons/114.9 miles	68	203.55
2001	2,352 tons/172.3 miles	86.18	451.20
2002	2,080 tons/151.2 miles	248.49	894.94
2003	2,524 tons/107.8 miles	221.02	946.2
2004	2,410 tons/131.3 miles	209.94	732.92
2005	2,352 tons/118.8 miles	217.50	863.72
2006	2,646 tons/155.3 miles	119.13	828.4
2007	2,052.5 tons/130.5 miles	145.77	547.17
2008	2,072.5 tons/134.5 miles	68.58	469.9
2009	1,897 tons/150.7 miles	86	403.02
2010	1,980 tons/43.9 miles	210.74	676.23
2011	1,680 tons/99.5 miles	160.29	559.14
2012	1,682 tons/ 94.4 miles	384.67	485.63
2013	1,651 tons/ 88.2 miles	396.97	250.16
TOTAL	70,345 tons	2,623.28	8,486.49

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